NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic

Field No. PHP-10-5-92

Registry No. H-10447

H10447

LOCALITY

State ..... California

General Locality ..... Sacramento River

Sublocality ... Sacramento River to Cache Slough

1992

CHIEF OF PARTY
LT Gerd F. Glang, NOAA

LIBRARY & ARCHIVES

DATE ..... MAR 6 1995

☆U.S. GOV. PRINTING OFFICE: 1987—756-980

Diagram 5527

P/L

PRODS

CP7
18661A
18662A
18010NC

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTER NO.

H-10447

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

PHP-10-5-92

State: California

General locality: Sacramento River

Locality: Sacramento River to Cache Slough

Scale: 1:10,000 Date of survey: Nov. 3 to Dec 3, 1992

Instructions dated: June 17, 1991 Project No.: OPR-L208-PHP

Vessel: Jensen Launch 1101 (0651), MonArk Launch 1102 (0652)

Chief of party: LT Gerd F. Glang, NOAA

Surveyed by: LT G. Glang, LT D. Neander, ET E. Wernicke, ST R. Adams, ST L. K. Simmons

Soundings taken by echo sounder, hand lead, pole: Innerspace 448

Graphic record scaled by: PHP Personnel

Graphic record checked by: PHP Personnel

Verification by: Leonardo Deodato Automated plot by: PHS Xynetics Plotter

Evaluation by: Bruce A. Olmstead

Soundings in ~~fathoms~~ ~~feet~~ meters & decimeters at ~~MLW~~ MLLW

REMARKS: Time in UTC. Revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

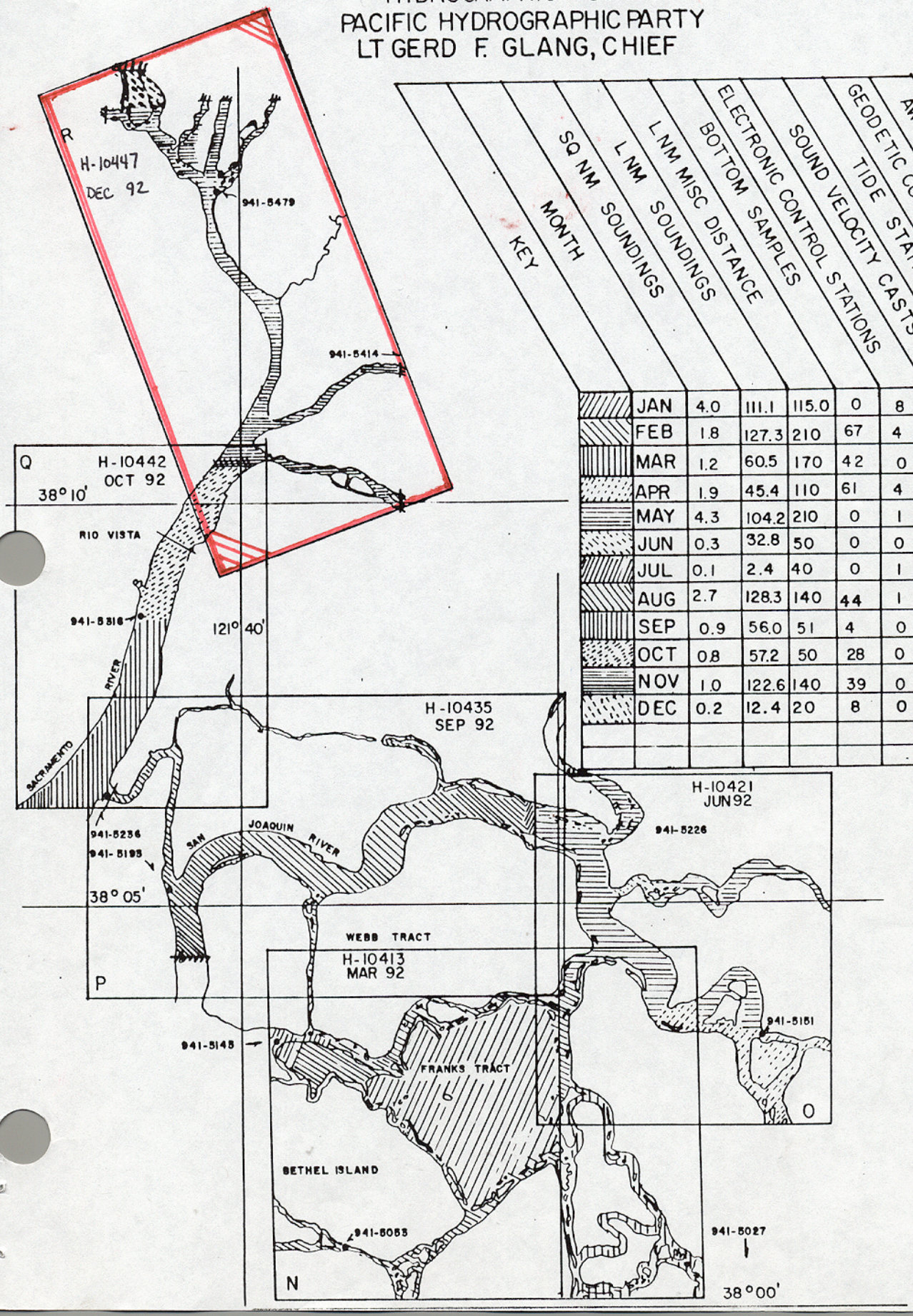
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

AWOIS and SURF ✓ RWD 3/95

U.S. GOVERNMENT PRINTING OFFICE: 1986 - 652-007/41215

PROGRESS SKETCH
OPR-L208-PHP

SACRAMENTO RIVER, CA. SHEETS N,O,P,Q,R
JANUARY - DECEMBER 1992
HYDROGRAPHIC SURVEY
PACIFIC HYDROGRAPHIC PARTY
LT GERD F. GLANG, CHIEF



KEY	MONTH	SQ NM SOUNDINGS	LNM SOUNDINGS	LNM MISC DISTANCE	BOTTOM SAMPLES	ELECTRONIC CONTROL STATIONS	SOUND VELOCITY CASTS	TIDE STATIONS	GEODETIC CONTROL STATIONS	AWOIS ITEMS RESOLVED
	JAN	4.0	111.1	115.0	0	8	2	0	37	3
	FEB	1.8	127.3	210	67	4	5	0	0	3
	MAR	1.2	60.5	170	42	0	3	1	0	13
	APR	1.9	45.4	110	61	4	2	0	0	0
	MAY	4.3	104.2	210	0	1	3	0	0	5
	JUN	0.3	32.8	50	0	0	1	0	1	17
	JUL	0.1	2.4	40	0	1	1	2	0	0
	AUG	2.7	128.3	140	44	1	7	0	1	0
	SEP	0.9	56.0	51	4	0	7	1	1	14
	OCT	0.8	57.2	50	28	0	3	2	0	7
	NOV	1.0	122.6	140	39	0	4	0	0	9
	DEC	0.2	12.4	20	8	0	1	0	0	1

Descriptive Report to Accompany Hydrographic Survey H-10447

Field Number PHP-10-5-92
Scale 1:10,000
1992

Pacific Hydrographic Party
Chief of Party: LT Gerd F. Glang

A. PROJECT

This survey was conducted in accordance with Hydrographic Project Instructions OPR-L208-PHP, Sacramento River, California, dated June 17, 1991.

Hydrographic survey H-10447 was conducted to obtain data for maintenance of existing nautical charts, and for a new series of 1:12,500-scale charts. This project also responds to the San Francisco Pilots Association and the US Army Corps of Engineers (COE), Bay Model Engineering Office, by aiding the update of the Bay model.

This survey's sheet letter is "R", as specified by the project instructions. Sheet R is the last and final survey for Project OPR-L208.

B. AREA SURVEYED

See Evaluation Report, Section I

The area surveyed for H-10447 extends from approximately 1.5 NM north of Rio Vista, at 38°10'26"N on the Sacramento River Deep Water Ship Channel (SRDWSC), and at 38°09'17"N on the Sacramento River, north to 38°15'00"N on Prospect Slough, the SRDWSC, and on Miner Slough. The survey limit on Cache Slough was extended further north to 38°15'27"N to allow all of Wright Cut, and a flooded portion of Hastings Tract, to be surveyed. This extension of the northern limit of H-10447 was discussed with N/CG241 (LCDR John Wilder) by telecon. The western limit of hydrography occurs at 121°42'05"W, on Lindsey Slough. The eastern limits of hydrography occur at 121°37'15"W on Steamboat Slough, and at 121°37'07"W on the Sacramento River.

To accommodate all data on one HDAPS sheet, the plotter sheet for H-10447 was skewed to 250°, with the overall limits of hydrography measuring 71.5cm by 105.2cm at the scale of the survey. Hydrographic limits for H-10447 are within those required by the Hydrographic Manual (Section 1.2.4, p. 1-6).

Data acquisition was conducted from November 3 (DN 308) through December 3 (DN 338), 1992.

C. SOUNDING VESSELS ✓

NOAA Launch 1101 (EDP No. 0651), a 29-foot Jensen, and NOAA Launch 1102 (EDP No. 0652), a 22-foot SeaArk, were used for hydrography, bottom samples, velocity casts and to conduct shoreline verification. Bottom drags were conducted from VN 0651 exclusively. No changes to the standard vessel sounding configuration were necessary.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

This survey was completed with the following HDAPS Programs:

Program Name	Program Version	Installation Date
PRESURVEY	7.00	24 Sep 1992
NEWPOST	6.00	24 Sep 1992
CARTO	2.03	24 Sep 1992
BIGABST	2.03	24 Sep 1992
PRINTOUT	4.01	24 Sep 1992
INVERSE	2.00	24 Sep 1992
CONVERT	3.51	24 Sep 1992
LSTAWOIS	3.01	24 Sep 1992
BACKUP	2.00	24 Sep 1992
FILESYS	3.01	24 Sep 1992
GRAFEDIT	1.00	24 Sep 1992
LISTDATA	1.00	24 Sep 1992
QUICK	2.00	24 Sep 1992
BLKEDIT	2.00	24 Sep 1992
REAPPLY	2.01	24 Sep 1992
PLOTALL	2.06	24 Sep 1992
DP	2.11	24 Sep 1992
MAN_DATA	2.00	24 Sep 1992
EXCESS	4.10	24 Sep 1992
ZOOMEDIT	2.10	24 Sep 1992
SELPRINT	2.02	24 Sep 1992

The following non-HDAPS computer programs were used: ✓

Program Name	Program Version	Version Date
VELOCITY	1.11	1990
NADCON	1.01	1989
DDPROC	4.03	1990
MTEN 4	20	1991
GEOID90	1.00	1990
ASHTECH GPS MP	2.2	1990-1992
WORDPERFECT	5.1	1991

The PC-DAS SURVEY Program, version 4.02 (GPS implementation), was used for all data acquisition. The master printout was annotated whenever software problems affected the data.

E. SONAR EQUIPMENT ✓

Not applicable.

F. SOUNDING EQUIPMENT ✓

During this survey, the following Innerspace Model 448 (IN-448) echosounders, modified with custom EPROMS for HDAPS, were used:

Echosounder* Type	Vessel EDP No.	Serial No.	DN Used
IN-448	0651	236	308-338
IN-448	0652	239	309-338

* Single Beam

Soundings were recorded in meters, with an assumed speed-of-sound through water of 1500 m/sec. Depths encountered in the survey area ranged from awash to 38.4 meters.

The digitized soundings displayed on-line were compared in real time with the analog trace to ensure reasonable agreement. No on-line calibration adjustments were required for the IN-448. ✓ Occasional breaks in the on-line echogram occurred when depth range scales required adjusting, especially where the river bottom rose or fell steeply along the deep water ship channel and in the sloughs. These breaks are not considered significant. No problems were encountered during office processing.

Sounding poles were made by PHP using commercial surveyor's level-rod tape. These self-adhesive, pre-printed tapes are calibrated in centimeter intervals. They were laminated with clear epoxy to two-inch diameter wooden rods finished with white ✓ marine epoxy paint. The sounding poles are 3.3 meters long. No further calibrations are required. The sounding poles were used for measuring least depths on shallow AWOIS* investigations.* There were no least depths determined by sounding pole during this survey.

Metric leadlines were made by PHP in accordance with HSG 69. Each leadline is 7/16-inch double-braided dacron line. Markings are at one-meter intervals from 0 to 19, and are shrink-tubing secured with epoxy glue. This deviation from HSG 69 makes for a more rugged leadline. ✓ Markings were calibrated during fabrication with a steel surveyor's tape while the line was under six pounds of constant tension. The throwing end is a standard six-pound lead shackled to a stainless steel thimble bent to the bitter end. Leadlines were used for depth comparisons with the echosounders and for measuring least depths on AWOIS*

investigations. Calibration forms are included in Separate IV* (Sounding Equipment Calibration and Corrections). * There were no least depths determined by leadline during this survey

G. CORRECTIONS TO SOUNDINGS ✓

Velocity of Sound

Corrections for the speed of sound through the water column were computed from data obtained with an Applied Microsystems Laboratories (AML) Velocity of Sound Profiler (S/N 03004). The VELOCITY Program was used to determine the speed of sound correctors. The following casts were taken:

Cast	DN	Depth*	DN Range	HDAPS Tables 0651	HDAPS Tables 0652	Cast Position Latitude	Cast Position Longitude
1	311	42.3	308-315	1	2	38°11'13"N	121°39'35"W
2	316	39.4	316-320	3	4	38°11'13"N	121°39'35"W
3	321	41.1	321-327	5	6	38°11'13"N	121°39'35"W
4	328	30.9	328-335	7	8	38°11'13"N	121°39'35"W
5	336	34.1	336-340	9	10	38°11'09"N	121°39'39"W

*Extrapolated depth.

Velocity corrector tables were created for both vessels from each cast due to their different drafts. The static draft for VN 0651 was rounded up to 0.5 meters during velocity corrector computations to accommodate processing by N/CG245. Copies of all velocity cast data and HDAPS Velocity Corrector Tables are included in Separate IV.*

The AML instrument was calibrated by Northwest Regional Calibration Center on January 7, 1992. A copy of this calibration report is included in Separate IV.*

Leadline Comparisons ✓

Leadline comparisons were taken almost daily to determine instrument error and to verify static draft. The instrument correctors for IN-448 S/N 236 (VN 0651) varied from -0.615 to +0.285 meters (overall mean = -.085 meters). The instrument correctors for IN-448 S/N 238 (VN 0652) varied from -0.300 to +0.270 meters (overall mean = +.027 meters). These correctors were not applied to final field sheet soundings as they were not constant and may have been due to bottom type or individual operators. Leadline comparisons were annotated on the echograms and a Leadline Comparison Log is included in Separate IV.*

Static Draft ✓

A static draft for VN 0651 was determined on June 25, 1992, in two steps. The first step determined the depth of the transducer

* Filed with the survey records.

face from a reference mark on the hull. The second step involved measuring the depth from this reference mark to the launch's waterline with the launch in water (fuel tanks half full and two crew aboard). A static draft of 0.28 meters was determined. This draft agrees with historical data.

A static draft for VN 0652 was determined on October 15, 1991, using a similar method as above. A static draft of 0.4 meters was determined. This static draft differs by 0.12 meters from the static draft measurement obtained in June 1989. This change in static draft is likely due to an addition of 100 pounds of ballast and the gradual deterioration of the launch's flotation.

Dynamic Draft

Settlement and squat measurements for VN 0651 were conducted on October 22, 1991, on the San Joaquin River, north of Antioch, CA. Settlement and squat measurements for VN 0652 were conducted on October 18, 1991, on the Sacramento River, in the vicinity of Rio Vista, CA.

Draft and settlement and squat correctors are applied online to all survey data via the HDAPS Offset Tables. Offset Table 1 corresponds to VN 0651. Offset Table 2 corresponds to VN 0652. Field records are included in Separate IV.*

Tide Correctors

The Final Field Sheets were plotted using predicted tides based on San Francisco, California. One tidal corrector zone from the Tide Zone Chart (+04:15 HR HW, +5:30 HR LW, x 0.85 Height Ratio) was applied to all sounding data.

Approved water levels were requested from the ~~Sea and Lake Levels~~ Product and Services Branch (N/OES231) in a letter dated December 18, 1992. A copy of this letter is included in Appendix V*(Tides and Water Levels). The approved Tide Note dated February 18, 1993 is attached.

H. CONTROL STATIONS See Evaluation Report, Section 2

Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD 83). A copy of the HDAPS Control Station Table is included in ~~Appendix III (List of Horizontal Control Stations).~~ this report.

Survey Methods

Geodetic positions used for establishing horizontal control on this survey were determined using PHP's Global Positioning System (GPS) receivers.

* Filed with the Survey records

Station 800 (PHP1, 1992) is considered non-recoverable. Station PHP1 is the differential GPS (DGPS) reference station located at the PHP office trailer in Rio Vista, CA, positioned on August 13, 1992. After the DGPS reference station antenna was installed on a 20-foot tower bolted to the trailer, a position was computed by relative static observations (GPS baselines) between DROUIN RM2 1931 and PHP1, and again between HPGN CA 10 11 1991 and PHP1. Copies of the Trimble positioning solution summaries and the MTEN inverse computation between the two positions observed for PHP1 1992 are included in Appendix III.* Closures obtained for PHP1 1992 exceed Third Order, Class I, standards. Station 800 (PHP1, 1992) is located outside the sheet limit.

Station 807 (SR28, 1992) is Sacramento Deep Water Ship Channel Light 28. This light, positioned on September 22 (DN 266), was used to conduct the daily launch DGPS performance checks for this survey. A position was computed by relative static observations (GPS baselines) between DROUIN RM2 1931 and SR28, and again between HPGN CA 10 11 1991 and SR28. Copies of the Trimble positioning solution summaries and the MTEN inverse computation between the two positions observed for SR28 1992 are included in Appendix III.* GPS Observation Log sheets were included in the data files for survey H-10442. This station is considered non-recoverable and undescribed as no data will be submitted to NGS. Closures obtained for SR28 1992 exceed Third Order, Class I, standards. Station 807 (SR28, 1992) is located outside the sheet limit.

Serial numbers for the GPS equipment are listed in Section I (Hydrographic Position Control) of this report. GPS Observation Log sheets, annotated with equipment serial numbers used during geodetic surveying, were submitted with field data for survey H-10442.

The 1992 OPR-L208-PHP Horizontal Control Report was submitted by N/CG2333 in July, 1992. The final adjusted position for DROUIN RM2 1931 and the preliminary adjusted position for HPGN CA 10 11 1991 were provided by N/CG2333 and can be found in Appendix III.*

I. HYDROGRAPHIC POSITION CONTROL

Position Control

Differential GPS (DGPS) was used for position control throughout this survey. The DGPS reference station, PHP1 1992, was installed as described in Section H (Control Stations) of this report, in accordance with FPM Section 3.4.6. Per FPM Section 3.4.6.3, the reference site was confirmed using the program MONITOR. A copy of the scatter plot and the outlier.sum file are included in Separate III*(Horizontal Position Control and Corrections to Position Data).

* Filed with the Survey records.

DGPS Performance Checks ✓

Per FPM Section 3.4.4.1, DGPS performance checks were obtained at the beginning and end of each survey day using Station SR28 1992, a fixed aid to navigation positioned to Third Order, Class I standards (described in Section H, Control Stations). All DGPS performance checks were successful. DGPS performance check forms are located in the data files.

Data collected with poor DGPS control, easily identified during processing by their physically impossible eastings and northings, were immediately rejected. DGPS control failed when a) the minimum number of satellites were no longer available, b) when the maximum allowable HDOP was exceeded, or c) when the reference station's differential correctors could not be received by the survey vessel.

Positioning Equipment ✓

The following GPS equipment was used:

Equipment Location	Type of Receiver/Antenna	Receiver Serial No.	Antenna Serial No.
PHP1 (DGPS Ref. Sta.)	Trimble 4000SST	2952A00459	2951A00123
Spare (used for geodetic work)	Trimble 4000SST	2952A00461	2951A00008
VN 0651	Ashtech	700417A1080	700378A0272
VN 0652	Ashtech	700417A119 (DN 308-311)	700378B0402
VN 0652	Ashtech	700417A1141 (DN 312-338)	700378B0402

On DN 311, the Ashtech DGPS sensor aboard VN 0652 was changed due to a suspected failure. Further diagnoses determined that the ✓ antenna cable had failed, and not the sensor. A new cable was installed.

The unique numbers for all equipment serial numbers are annotated on the daily master printout.*

* Filed with the survey records.

J. SHORELINE See Evaluation Report, Section 2.

Sources

Shoreline detail shown on the final field sheet was transferred by hand from a stable-based 1:10,000 scale enlargement of TP-01055 (1:20,000, NAD 27, April 1983) and, north of approximately 38°15'00"N (Little Hastings Tract and Wright Cut), from a stable-based 1:10,000 scale enlargement of NOS Chart 18662-SC (1:40,000, NAD 83, 18th edition, May 23, 1992).

NAD 27 datum ticks were applied to the NAD 83 field sheets and are shown in green on the FFS (Final Field Sheet). Datum transformation from NAD 83 to NAD 27 was in accordance with FPM Section 7.4. A printout of the NADCON Program datum transformation is included in Separate I* (Hydrographic Sheets and Parameters).

Verification ✓

Unless specifically discussed in this section or Section N (Comparison with the Chart), all shoreline details were verified and are depicted on the Final Field Sheet.

Field notes from shoreline verification can be found on the echograms, on the boatsheets, and the paper DP plots. Detached Position Listings created by the HDAPS DP Program, along with the cartographic tables generated in the CARTO Program, are included in the data files.

TP-Sheet Shoreline Agreement ✓

TP-sheet shoreline was verified by its junction with the hydrographic data, by detached positions, and by visual inspection. The TP-sheet shoreline generally agreed well with the hydrographic data, although several shoreline changes have occurred since the photography was flown; these changes are discussed below. Some disagreement was apparent while aligning the TP-sheet latitude/longitude grid with the NAD 27 datum ticks on the FFS. This disagreement is likely due to the scale distortion which occurs during the TP-sheet enlargement process. Concur

Charted Shoreline Agreement ✓

Charted shoreline was verified by its junction with the hydrographic data, by detached positions, and by visual inspection. Shoreline from the chart enlargement was severely distorted and did not correspond to the hydrographic field notes. This distortion is likely due to the very old shoreline manuscripts used on Chart 18662 and the enlargement process. The shoreline is mostly levee, often reinforced with riprap, while the small islets are marsh (tule). Comparison of the charted

* Filed with the survey records.

shoreline with the TP-sheets also show a number of differences. Where these differences were found, the TP-sheet was considered to be more accurate. In the area north of the TP-sheet limit, no shoreline was transferred to the FFS; all shoreline features shown are derived from this survey and are thus shown in red on the ~~FFS~~ Smooth Sheet.

TP-Sheet Changes ✓

The following significant changes to TP-01055 were observed:

The pier shown on TP-01055 on the south shore of the entrance to Steamboat Slough at position 38°10'53.673"N, 121°39'31.094"W, (Pos. No. 6062, DN 309, VN 0651) is now in ruins and lies in an area foul with other debris including snags and a floating dock in ruins. The hydrographer recommends designating this area foul south to the shoreline as shown on the FFS. Pier and the area immediately adjacent have been shown on the smooth sheet in ruins.

The dock shown on TP-01055 on the west shore of the Cache Slough/SRDWSC between Lights 39 and 40 does not exist. On DN 310 (VN 0651) a row of piles was located 20 meters north of the position of the dock shown on TP-01055. The southernmost of these piles was positioned at 38°11'17.328"N, 121°39'40.739"W (Pos. No. 6179). The row uncovers 1.2 meters at MLLW, is 0.5 meter from the shoreline and extends 20 meters north to a floating dock at 38°11'17.820"N, 121°39'40.330"W (Pos. No. 6180). Twenty meters south of the TP-01055 dock, a single pile uncovering 0.8 meters at MLLW was positioned at 38°11'16.130"N, 121°39'41.435"W, (Pos. No. 6178) 12 meters from the shoreline. Either of these sets of piles could be the remains of the dock shown on TP-01055. The hydrographer recommends charting the floating dock as surveyed at 38°11'17.820"N, 121°39'40.330"W. Do not concur The features located by the hydrographer cannot be adequately depicted on the smooth sheet based on survey scale and proximity to the shoreline. They are covered under the "Note B, Caution".

The dock or pier shown on TP-01055 on the east shore of Cache Slough/SRDWSC south of Light 42 was not found. A single pile ~~uncovering~~ Baring 5.8 meters at ~~MLLW~~ MHW was located 10 meters from the shoreline at the position of the TP-Sheet pier, 38°11'29.362"N, 121°39'23.362"W (Pos. No. 6189, DN 310, VN 0651). Thirty meters south of this pile, a row of piles in ruins was located at 38°11'28.602"N, 121°39'23.961 (Pos. No. 6190). The row is 3 meters from the shoreline, uncovers 0.8 meters to awash at MLLW and extends south 60 meters to 38°11'26.982"N, 121°39'25.489"W (Pos. No. 6191). The hydrographer recommends charting the piles as shown on the FFS. Do not concur. The single pile and row of piles as portrayed on the smooth sheet should not be charted as they are covered under the "Note B, Caution" on chart 18664.

The pile shown on TP-01055 in the north channel of the entrance to Miner Slough at position 38°13'58.017"N, 121°40'16.092"W, (Pos. No. 267, DN 315, VN 0652) was not found. Seventy meters west of the target position, two piles were located 10 meters offshore of a small islet which support a sign for Arrowhead Harbor. These piles ~~uncover~~ bare 3.1 meters at ~~MLLW~~ MHW. The hydrographer recommends removing the charted pile and charting

the two piles with sign at the surveyed position, 38°13'57.782"N, 121°40'19.078"W (Pos. No. 265). Do not concur Chart a sign as portrayed on the smooth sheet at the position listed above

Two fixed piers are shown on TP-01055 at the east end of Long Island. The ~~easternmost~~ western pier is a walkway leading to a dolphin ~~uncovering~~ bearing 1.1 meters at ~~MLLW~~ MHW at position 38°09'53.416"N, 121°37'11.864"W (Pos. No. 6028). The ~~easternmost~~ westernmost pier does not exist. A dolphin ~~uncovering~~ bearing 10.1 meters at ~~MLLW~~ MHW with no pier attached was located at the position of the pier on TP-01055, 38°09'53.436"N, 121°37'12.858"W, (Pos No. 6029, DN 308, VN 0651). The hydrographer recommends charting the walkway and two dolphins as surveyed. Do not concur Due to chart scale, chart both dolphins as one symbol and label Dols.

An unnamed tickmark on TP-01055 on the west shore of Cache Slough/SRDWSC south of Light 47 was identified as a siphon with platform. Five meters to the north of the siphon is a concrete floodgate with wood bulkhead (see photo). The siphon was positioned with piles which ~~uncover~~ bare 2.1 meters at ~~MLLW~~ MHW at 38°13'16.035"N, 121°40'26.127"W (Pos. No. 6249, DN 311, Vn 0651). Piles ~~uncovering~~ bearing 1.6 meters at ~~MLLW~~ MHW which mark the junction of the floodgate and bulkhead were positioned at 38°13'16.360"N, 121°40'26.582"W (Pos. No. 6248). The hydrographer recommends identifying the TP-Sheet structure as a siphon and floodgate. Concur However, these items should not be charted as they are covered under the "Note B, Caution" on chart 18661.

A dolphin positioned on TP-01055 south of Prospect Slough at 38°14'02.067"N, 121°40'52.262"W at the southeast end of a small islet in Cache Slough was not found. Tree snags were located in this position (Pos. No. 132, DN 314, VN 0652). The snags appear to be attached to the islet and uncover 2.9 meters at MLLW. The hydrographer recommends not charting the ~~pile~~ pole as shown on the T-Sheet and charting the snags at the surveyed position. Do not concur The Snags as portrayed on the smooth sheet should not be charted as they are covered under the "Note B, Caution".

A small islet shown on TP-01055 in Cache Slough at 38°14'12.694"N, 121°40'56.566"W, has been submerged. On DN 314 (VN 0652) a tree snag was located at this position (Pos. No. 134). The snag is 50 meters offshore of an islet to the east and uncovers awash to 0.6 meters at MLLW. The hydrographer recommends charting the snag as shown on the ~~FFS~~ smooth sheet and deleting the marsh islet as currently charted. Concur

Little Hastings Tract located east of Wright Cut and centered at position 38°15'01.197"N, 121°14'29.632"W, is now flooded. The flooding appears to have been caused by two breaks in the levee wall, one at 38°15'09.313"N, 121°41'39.744"W, (Pos. No. 7549, VN 0651) and the other at 38°15'21.821"N, 121°41'33.345"W, (Pos. No. 784, VN 0652). The surrounding levee is fragile and thinning, with some trees and vegetation. Sounding lines were run within the entire flooded portion at 50-meter spacing on DN's 322 and 324 (VN 0652). Depths ranged between 0.4 and 1.4 meters. A crossline run on DN 336 (VN 0651) was more shoal by up to 0.3 meters, possibly due to slower drainage of the flooded portion during falling tides. The hydrographer recommends removing the

charted shoreline at these breaks in the levee and charting soundings from this survey as shown on the ~~FFS~~ Smooth Sheet. Concur

The southwest side of Liberty Island has eroded toward the northeast leaving two elongated islets trending northwest - southeast. The eroded section of shoreline, shown in red (dashed) on the ~~FFS~~ Smooth Sheet, is 475 meters long, and extends from 038°14'39.379"N, 121°41'14.545"W (Pos. No. 277, DN 315, VN 0652) south to the pile uncovering 0.9 meters at MLLW located at 038°14'31.962"N, 121°41'01.471"W (Pos. No. 17, DN 309, VN 0652). The islets extend from 038°14'37.609"N, 121°41'06.132"W, (Pos. No. 278, VN 0652) south to 038°14'32.15"N, 121°41'06.132"W (Pos. No. 279, VN 0652). The larger, northernmost islet is 150 meters long; the other is 65 meters long. Depths between the islets and the receded shoreline range between 0.2 and 6.2* meters at MLLW. The hydrographer recommends charting the eroded shoreline and islets as shown on the ~~FFS~~ Smooth Sheet. Concur

* Deepest depth on Smooth Sheet is 4.3 meters. 6.2 excessed for shoaler depths.

A portion of the west shore of Prospect Slough has eroded 55 meters leaving a new 50-meters-long islet* trending northeast to southwest. This islet, shown in red on the FFS, is the location of control station Isle 1992. Another islet lies to the southwest of Isle 1992 and extends from position 38°14'18.912"N, 121°40'58.040"W, 525 meters north to 38°14'33.0"N. This islet is shown on TP-01055, but has enlarged to the southeast due to accretion. The changes in the shoreline in this area were determined by sounding lines. The hydrographer recommends charting the changes to the T-Sheet shoreline as shown on the ~~FFS~~ Smooth Sheet. Changes to the shoreline are shown in dashed red on the Smooth Sheet. * This islet is located at 38°14'36"N, 121°40'44"W. Concur

The passage shown on TP-01055 between the islet and the southwest tip of the peninsula separating the SRDWSC and the flooded portion of Prospect Island south of Prospect Slough is foul with grass or tule and impassable. The northern limit of the foul area is marked by snags at 38°14'14.869"N, 121°40'51.330"W (Pos. No. 575, DN 322, VN 0652) and a snag at 38°14'14.752"N, 121°40'50.216"W (Pos. No. 576, DN 322, VN 0652). The hydrographer recommends charting the foul limit (snags) as shown on the ~~FFS~~ Smooth Sheet. Concur

Passages between the northernmost large islets shown on TP-01055 on the south side of Prospect Island in Miner Slough are foul with snags, tule and overgrown trees. The western foul limit on the northernmost passage is between 38°14'06.942"N, 121°40'20.484"W (Pos. No. 263, DN 315, VN 0652) and 38°14'02.836"N, 121°40'20.770"W (Pos. No. 264, DN 315, VN 0652). The hydrographer recommends charting the foul area (snags) as depicted on the ~~FFS~~ Smooth Sheet. Concur

The old channel shown on TP-01055 on the north shore of Miner Slough is marked by a private buoy at 38°14'26.906"N, 121°39'53.517"W (Pos. No. 255, DN 315, VN 0652). The old channel is closed off at its southeastern limit as shown on TP-01055. At

position 38°14'40.306"N, 121°39'41.846"W, (Pos. No. 251, DN 315, VN 0652) the channel is impassable and, for the last 120 meters, foul with snags and overgrown with trees. The hydrographer recommends charting the foul area south of Pos. No. 251 as shown on the ~~FFS~~ smooth sheet. Concur Chart the navigable portion of the old channel with representative depths as portrayed on the smooth sheet.

The dolphins shown on TP-01055 within a small inlet on the east side of Cache Slough were located in conjunction with a search for AWOIS Item No. 51650. On DN 311 a visual search located the wreck of a partially submerged barge, approximately 50 meters long, at position 38°12'29.950"N, 121°39'23.089"W (Pos. No. 6229, VN 0651). The barge ~~uncovers~~ bares 2.4 meters at ~~MLLW~~ MHW and lies in the small inlet foul with ruins, the dolphins shown on TP-01055, siphons, snags and other debris (see photo). The hydrographer recommends charting a wreck in position 38°12'29.950"N, 121°39'23.089"W, and designating the inlet foul as shown on the ~~FFS~~ Smooth Sheet. Concur

On the north shore of Steamboat Slough, directly east of Hidden Harbor Marina, an expansion of the marina has been constructed with a separate entrance. Pos. No. 325 (DN 321, VN 0652) marks the west side of the entrance to the new section at 038°11'00.942"N, 121°39'16.908"W; Pos. No. 326 marks the east side of the entrance at 038°11'01.490N, 121°39'15.747"W. Both marinas are marked across their entrances by round buoys 0.3 meters in diameter. The hydrographer recommends that the new section of Hidden Harbor Marina be charted as depicted in red dashed on the ~~FFS~~ smooth sheet. Concur

The eastern third of the channel shown on TP-01055 running between the south side of Ida Island and the north side of Brannan Island is impassable due to heavy seagrass. Pos. No. 359 (DN 321,VN 0652) marks the eastern limit of the navigable portion of the west end of the channel at 038°10'07.481"N, 121°38'09.618"W; the floating dock at 038°10'02.064"N, 121°37'51.877"W (Pos. 374, DN 321, VN 0652) marks the western limit of the navigable portion of the east end of the channel. The hydrographer recommends charting the foul limits in the channel as shown on the ~~FFS~~ smooth sheet. Concur In addition, chart the navigable portion of the west end of the channel as shown on the smooth sheet.

An uncharted tule islet not identified on TP-01055 was located along the west shoreline of the SRDWSC at 038°14'40.789"N, 121°40'19.409"W (Pos. No. 6242, DN 311, VN 0651). The islet is 2 meters offshore, 20 meters long and parallel to the shore. The hydrographer recommends that the islet be charted as depicted in red on the FFS. Islet has been shown in dashed red on the smooth sheet. Due to proximity with the existing shoreline and chart scale, this minor revision will be generalized into the TP MHWL.

Charted Shoreline Changes

An uncharted small tule islet 8 meters in diameter was located at the north end of the flooded section of Hastings Tract east of Wright Cut. Pos. No. 774 (DN 324, VN 0652) marks the south side

of the islet at 038°15'18.515"N, 121°41'30.176"W. The hydrographer recommends that this islet be charted as depicted in red on the ~~FFS~~. Smooth Sheet. Concur

K. CROSSLINES ✓

A total of 29.1 nautical miles of crosslines and channel lines, representing 22% of the hydrography on H-10447, were used for crossline comparisons. Crossline soundings generally agree to within 0.3 to 0.7* meters of the mainscheme soundings. The most significant differences observed occurred where crosslines ran along steep sloping areas (i.e., outer channel lines) and in the sloughs. The hydrographer notes the crossline run in Little Hastings Tract was consistently shoaler than mainscheme soundings, by up to 0.3 meters. Launch personnel were able to observe on several occasions during falling tides that the remaining levee which surrounds Little Hastings Tract apparently slows the draining of this flooded area. Since the crossline was acquired on a different day than the mainscheme hydrography, it appears that the tide correctors used do not adequately predict the stage of tide within the flooded tract. Concur * Application of approved tides brought agreement to within .2 to .3 meters.
The same vessels were not always used for both mainscheme hydrography and crosslines.

L. JUNCTIONS See Evaluation Report, Section 5.

H-10447 junctions at its southern limit, 38°10'30"N, with survey H-10442 (1:10,000-scale, October 1992, Sacramento River, Vicinity of Rio Vista). No other contemporary surveys junction with H-10447. Two mainscheme sounding lines (or approximately 100 meters) overlap this adjoining survey; soundings in this area compare within 0.5 meters. Depth curves matched generally very well, given the irregular bottom of the Sacramento River. The hydrographer believes this junction is adequate to excellent, and recommends soundings from this survey supersede data from H-10442 in their common areas. Do not concur Data sets from both surveys should be considered when drawing depth curves within the common areas.

M. COMPARISON WITH PRIOR SURVEYS See Evaluation Report, Section 6

Per the Chart Markup, no prior surveys exist for comparison with data on H-10447. The hydrographer presumes all charted soundings originate from U.S. Army Corps of Engineers surveys. Concur

N. COMPARISON WITH THE CHART See Evaluation Report, section 7

This survey was compared to stable-based 1:10,00-scale enlargements of the following charts in areas common with this survey:

Chart No.	Scale	Edition	Date
18661 SC	1:40,000	21st	May 9, 1992
18662 SC	1:40,000	18th	May 23, 1992

There were 14 AWOIS items within the limits of the H-10447 plotter sheet (HDAPS Plotter Sheet 22). Of these, two items (AWOIS Item Nos. 51643 and 51644) were resolved on survey H-10442. The remaining twelve AWOIS* items, originating from miscellaneous sources, were resolved as part of this survey and are discussed here. * AWOIS investigation forms can be found with the Separates Filed with the hydrographic data. Marginal notations and any corrections have been made to the AWOIS items, pages 14-17 of this report.

AWOIS Item No. 51645 originates from Chart Letter 1758/73 (USPS) and is described as a snag (PA) in position 38°10'31.690"N, 121°39'49.830"W. The snag is not shown on TP-01055/83. On DN 309, a snag was visually located within the target area at 38°10'31.~~3~~5"N, 121°39'49.0~~5~~8"W (Pos. No. 6060). The snag lies 70 meters from the shoreline in a shoal area with heavy grass and uncovers 0.~~2~~ meters at MLLW. The hydrographer recommends charting a snag in position 38°10'31.~~3~~5"N, 121°39'49.0~~5~~8"W. Remove the charted "Snag (PA)" shown in position 38°10'31.690"N, 121°39'49.830"W. Concur

AWOIS Item No. 51646 originates from an unknown source and is described as a submerged wreck first charted in 1984 at position 38°10'42.690"N, 121°40'08.830"W. On DN 310 a visual and echosounder search was conducted in the target area (Pos. No. 6172, VN 0651). Within 50 meters of the target, the launch struck bottom 60 meters NNE of SRDWSC LT 37 and 40 meters offshore. On DN 330 a dive investigation (Pos. No. 7441) was conducted. Divers were able to walk the limits of a submerged obstruction, using sounding poles to locate deeps. The bottom was hard and irregular and sloped away from Pos. No. 7441 in all directions. The divers also probed the bottom with a knife and found hard sediment; only a small amount of nondescript sediment could be removed with the knife. At approximately 50 meters seaward of the target position, the divers found a steep dropoff presumed to be the edge of the submerged obstruction or, possibly, the edge of the dredged deepwater channel. Visibility in the water was close to zero due to recent heavy rains. No conclusive evidence* of a wreck or wreckage was found. On DN 335, a 10-meter development was conducted over the target area (Pos. Nos. 7450-7503) to determine a least depth. Per this development, the hydrographer concludes a ~~submerged~~ obstruction ~~uncovering 0.2 meters~~ awash at MLLW (Pos. Nos. 7492+1, 7492 +2, and 7480+1) does exist. The hydrographer recommends charting an obstruction awash (wreckage) centered in position 38°10'4~~2~~.~~453~~619"N, 121°40'0~~8~~.~~830~~240"W (Pos. No. 14 on the original report in 1984. The geographic position of this feature is Lat. 38/10/43.87N, Long 121/40/08.24W.

* As there was no conclusive evidence of a wreck or wreckage, it is recommended to chart an obstruction. Labelled on SS as wreckage based

~~7492+1~~ 7441). Remove the charted "Subm Wreck" in position 38°10'42.690"N, 121°40'08.830"W. Concur

AWOIS Item No. 51647 originates from Chart Letter 206/70 (USPS) and is described as a row of dolphins (PA), 100 feet offshore, used as a "barge loading" area for sand from a borrow pit, centered in approximate position 38°10'49.690"N, 121°39'48.830"W. On DN 309 (VN 0651) shoreline verification was conducted in the target area; no dolphins or ruins were visible. Per Bill Sievers, Dutra Construction, 750 River Road, Rio Vista, CA 94571, (707-374-5701), his company removed the dolphins in the 1980's at the request of the Corps of Engineers. The COE was contacted but could not confirm that the request had been made. On DN 322, a 25-meter development was conducted over the target area (Pos. Nos. 7097-7148, VN 0651) and no evidence of dolphins or ruins was found. The hydrographer recommends removing the dolphins and ruins, and the "Dols PA" notation, shown centered in approximate position 38°10'49.690"N, 121°39'48.830"W, from the chart. This item required a 250 meter search using either a bottom drag or dive. Features should be charted as submerged (PA) due to inadequate search.

AWOIS Item No. 51648 originates from Blueprint 66162/64 (COE) and is described as piles (8ft x 8ft pump platform on four concrete-filled pilings, possibly an old tide gauge station) in position 38°11'20.690"N, 121°38'40.830"W. On DN 309 a visual search located a siphon pump on a 2.5m x 2.5m platform with steel piles (Pos. No. 6079, VN 0651), ~~uncovering~~ Bering 3.6 meters at ~~MLLW~~ MHHW (see photo). The hydrographer recommends charting a platform with a siphon in position 38°11'18.959"N, 121°38'40.230"W. Concur

AWOIS Item No. 51649 originates from Blueprint 27958 (COE, 1931) and is described as a 14.2 foot (4.3 meters) depth (on slope east of tule islet) in position 38°12'28.19"N, 121°39'28.83"W. On DN 322, mainscheme hydrography located shoal soundings of 3.8 and 4.2 meters. On DN 338, 25-meter splits over the target area further defined a shoal area extending from 38°12'17.637"N, 121°39'21.682"W (Pos. No. 7832, DN 338, VN 0651) to 38°12'31.616"N, 121°39'31.701"W (Pos. No. 6705, DN 326). Least depths of 3.7 meters (Pos. Nos. 7822+2 and 7826+2, VN 0651) were observed at 38°12'24.217"N, 121°39'24.736"W, and 38°12'22.482"N, 121°39'23.978"W. The hydrographer recommends soundings from this survey supersede charted soundings in this area. Concur

AWOIS Item No. 51650 originates from T-5016/31 and is described as a sunken dredge in position 38°12'30.490"N, 121°39'22.330"W. On DN 311 a visual search located the wreck of a partially submerged barge, approximately 50 meters long, at position 38°12'29.950"N, 121°39'23.089"W (Pos. No. 6229, VN 0651). The barge ~~uncovers~~ bares 2.4 meters at ~~MLLW~~ MHHW and lies in a small inlet foul with ruins (the dolphins shown on TP-01055/83), siphons, snags and other debris (see photo). The hydrographer recommends charting a wreck in position 38°12'29.950"N, 121°39'23.089"W. Concur

AWOIS Item No. 51651 originates from Chart Letter 1316/68 (USPS) and is described as a dolphin (PA) in position 38°12'49.690"N, 121°40'08.830"W. On DN 311 a visual search located a 3-pile dolphin at 38°12'47.384"N, 121°40'06.704"W, (Pos. No. 6251, VN 0651) ~~uncovering~~ bares 4.7 meters at ~~MLLW~~ MHW, approximately 80 meters SE of the AWOIS PA. The hydrographer recommends charting this dolphin in position 38°12'47.384"N, 121°40'06.704"W. Remove from the chart the dolphin shown in position 38°12'49.690"N, 121°40'08.830"W and the "Dol PA" notation. Concur

AWOIS Item No. 51652 originates from Chart Letter 1316/68 (USPS) and is described as piles (PA) in position 38°13'29.690"N, 121°40'30.830"W. On DN 314 mainscheme hydrography over the AWOIS target area found no echosounder contacts and no piles were visible. On DN 324 75-meter radius bottom drags were conducted centered at position 38°13'29.696"N, 121°40'31.004"W (Pos. No. 7246) with negative results. On DN 311 during shoreline verification a row of piles was located approximately 160 meters south of these charted piles, at position 38°13'25.230"N, 121°40'29.831"W (Pos. No. 6247, VN 0651), uncovering 1.7 meters at MLLW and directly along the riprap. The hydrographer suspects these are the charted piles located at the AWOIS GP. The apparent shift of the piles depicted on the chart (from which the AWOIS PA was selected) is likely due to the chart compilation and enlargement process and/or an error in the original source position. Concur The hydrographer recommends not charting this row of piles centered at 38°13'25.230"N, 121°40'29.831"W as they are not a hazard to navigation (refer to "Note B" on Chart 18661). Concur Remove the piles shown at approximate location 38°13'29.690"N, 121°40'30.830"W, and the "Piles PA" notation from the chart. Concur

AWOIS Item No. 51653 originates from Chart Letter 1316/68 (USPS) and is described as a submerged obstruction, possibly concrete foundations (no dimensions given), in position 38°14'08.690"N, 121°40'48.840"W. On DN 330 5-meter development hydrography (Pos. Nos. 7373-7435, VN 0651) located a shoal area with a least depth of 1.7 meters at MLLW (Pos. No. 7402+5) at 38°14'07.720"N, 121°40'48.594"W. This shoal appears as a very steep and narrow feature on the echogram, approximately 25 meters long in an east-west direction, and corresponds to a charted islet at the AWOIS GP. On the same day, 25-meter radius bottom drags were conducted centered at 38°14'08.703"N, 121°40'48.833"W, (Pos. No. 7440, VN 0651) with negative findings. The hydrographer believes the reported concrete foundations may have been on this charted islet, and the islet eroded and subsided to become a shoal. Concur It is further likely the concrete foundations have subsided into the bottom of the slough. The hydrographer recommends not charting the islet shown in position 38°14'08.690"N, 121°40'48.840"W and removing the associated notation "Subm obstr rep". Concur Recommend soundings from this survey supersede charted depths and features shown in this area. In particular, chart a 1.7-meter depth in position 38°14'07.720"N, 121°40'48.594"W. Concur

AWOIS Item No. 51654 originates from Chart Letter 1722/69 (USPS) and is described as a 70-foot (21.3 meters, unknown tide) reported deep in position 38°14'23.690"N, 121°40'53.84"W. On DN 314, during 50-meter mainscheme hydrography, a 20.4* meters at MLLW (66.6 feet, Pos. No. 177+1, VN 0652) sounding was located in position 38°14'25.389"N, 121°40'54.348"W, approximately 60 meters north of the reported AWOIS GP. No further hydrography was conducted in this area. The hydrographer was unable to locate any local sources regarding the origins of this deep. However, this deep is large enough, extending approximately 130 meters southwest to a depth of 17.6 meters (Pos. No. 175+1, VN 0652) at position 38°14'21.971"N, 121°40'57.192"W, that it is likely natural in origin, and not man-made. Depths over ten meters can be found throughout Prospect Slough. It is not clear if dredging has occurred (* Exceeded by a 15 meter depth at Lat. 38/14/25.2 N, Long 121/40/53.44W.) Chart depths as found by this survey

AWOIS Item No. 51655 originates from Chart Letter 1916/72 (USPS) and is described as pilings (PA) in position 38°14'29.690"N, 121°41'18.840"W. No pilings were visible during shoreline verification and none were observed on the echogram during hydrography. On DN 324 75-meter radius bottom drags were conducted centered at 38°14'29.757"N, 121°41'18.637"W (Pos. No. 7245, VN 0651) with negative findings. The hydrographer recommends removing the piles shown in position 38°14'29.690"N, 121°41'18.840"W and the associated "Piling PA" notation from the chart. Concur

AWOIS Item No. 51656 originates from Chart Letter 1056/74 (USPS) and is described as a snag (PA) in position 38°14'46.690"N, 121°41'58.840"W. No snags were visible during shoreline verification and none were observed on the echogram during hydrography. On DN 325 75-meter radius bottom drags were conducted centered at 38°14'46.656"N, 121°41'58.979"W, (Pos. No. 7244, VN 0651) with negative findings. The hydrographer recommends removing the snag shown in position 38°14'46.690"N, 121°41'58.840"W and the associated "Snag (PA)" notation from the chart. Concur

Dangers to Navigation ✓

No dangers to navigation were identified within the limits of this survey. Concur

Sounding Comparisons

A sounding comparison was made between a stable-based 1:10,000 scale enlargement of Chart No. 18661 SC (20th edition, May 9, 1992) and the H-10447 final field sheets. Agreement is good; charted soundings generally compare within 1 meter with the exception of two areas where scouring has apparently occurred. In Cache Slough east of the SRDWSC from latitude 38°10'30"N north to Light 41, soundings are significantly deeper than charted, achieving a maximum depth of 26 30.1 meters (85 100 feet). At the north end of the sheet, in Cache Slough, deepening has occurred along

the west shore beginning at the confluence of Prospect Slough and continuing south to the confluence with the SRDWSC. Deeps in this area range generally from 10 to 12 meters with the area immediately south of the mouth of Prospect Slough scoured to a maximum depth of ~~13.8~~ meters.

Sounding Comparisons - Controlling Depths See Evaluation Report, Section 7c.

The controlling depth for a width of 200 feet (61 meters) for the Sacramento River Deep Water Ship Channel (SRDWSC) is noted on Chart 18661 as 28.5 feet (8.6 meters) from the channel entrance to Lt. 40; thence 30.3 feet (9.2 meters) to Lt. 52, and 28.4 feet (8.6 meters) to the northern limit of the survey area. Soundings from this survey were found to be deeper overall, generally 10 to 12 meters at MLLW, with some sections significantly deeper. In the southern quarter of the survey, depths within the charted channel limits range from 10.2 to 26.0 meters. The channel is also generally broader. South of Light 39 the channel is 250-300 meters wide (820-980 feet). North of Light 39 the channel narrows to a range of 150 to 250 meters up to Light 49A where it narrows further to a width of 50 to 75 meters. The controlling depths are more conservative and, given the large-vessel traffic, are adequate for the surveyed area.

Non-Sounding Features Comparison ✓

Comparison was made between all non-sounding features and the hydrographic records. In accordance with Project Instruction paragraph 6.12.2, features near the HWL were judged not to be dangers to navigation and, unless noted otherwise below, were searched for by visual methods only. Several non-sounding features were previously discussed as AWOIS items.

All significant charted non-sounding features were previously discussed under Section J (Shoreline), with the following exceptions:

The "landings" as shown on the chart no longer exist. The term is a historical one defining specific sites used for the beaching of barges; these sites have been abandoned. The hydrographer recommends removing the label "landing" from the chart within the area of this survey. Concur

A siphon shown on the chart on the north shore of Steamboat Slough does not exist. Twenty piles in ruins were located at the position of the charted siphon, 38°11'39.702"N, 121°37'58.675"W (Pos. No. 6076, VN 0651, DN 309). The piles uncover 0.9 meter at MLLW, extend 15 meters east to west and are 5 meters from the shoreline. The hydrographer recommends removing the siphon from the chart and depicting the piles in the surveyed position. Do not concur These items should not be charted as they are covered under the "Note B, Caution on Chart 18661.

An unnamed charted feature positioned on the west shore of Cache Slough north of the abandoned Liberty Island cable ferry crossing was not found. On DN 309 (VN 0652) a tree snag uncovering 1.5 meters at MLLW was located 2 meters from shore in the approximate position of the charted feature at 38°14'26.094"N, 121°41'16.802"W (Pos. No. 9). The hydrographer recommends removing the charted feature. Concur The tree snag as found by this survey should not be charted as it is covered under the "Note B, Caution" on chart 18661

The pier charted on the north shore of the Sacramento River at the east end of an islet at 38°10'28.5"N, 121°39'08.0"W, was not found. Concur A tree snag uncovering 1.3 meters at MLLW was found in the vicinity of the charted item at 38°10'28.676"N, 121°39'09.867"W, (Pos. No. 6011, VN 0651, DN 308). A foul area extends from 38°10'28.564"N, 121°39'08.133"W, (Pos. No. 6012) off the east end of the tule island westward and along the south shore of the islet up to 38°10'29.009"N, 121°39'11.408"W (Pos. No. 6013). The hydrographer recommends charting the foul area as shown on the ~~FFS~~ smooth sheet. Concur Snag should not be charted as it is covered under the "Note B, Caution", on chart 18661

The pier charted between two islets on the north shore of the Sacramento River at 38°10'31.0"N, 121°39'15.0"W, is now in ruins. A set of 7 piles in ruins uncovering 0.3 meter at MLLW was located at 38°10'31.394"N, 121°39'15.158"W (Pos. No.6015, VN 0651, DN 308). The piles extend in two rows 10 meters offshore of Grand Island. A second set of piles in ruins uncovering 0.3 meter at MLLW extends in two rows 10 meters seaward from the tule islet at 38°10'30.954"N, 121°39'15.542"W (Pos. No. 6016). The hydrographer recommends removing the charted pier and charting the piles in ruins at the surveyed positions. Do not concur The features located by the hydrographer cannot be graphically depicted on the chart due to scale. These items are covered under the "Note B, Caution".

An extensive portion of the charted marsh area southeast of Prospect Slough and northwest of the Sacramento River Deep Water Ship Channel (SRDWSC) is flooded. The flooded portion extends along the southeast side of Prospect Slough from position 38°14'18.912"N, 121°40'58.020"W, (Pos. No. 118, VN 0652) south 600 meters to the levee between the flooded portion and the SRDWSC. This flooded area continues north-northeast for 1800 meters beyond the north sheet limit of H-10447 along the west side of the SRDWSC. Sounding lines were run within the entire flooded portion at 50-meter spacing on DN's 314 and 322 (VN 0652). On DN 338 (VN 0652) sounding lines were run in the southern section of the area. Depths ranged from 0.2 to 0.9 meters at MLLW. On DN 315 (VN 0652) crossline soundings were in good agreement with mainscheme soundings. The hydrographer recommends removing the charted marsh from the flooded area and charting the soundings from this survey. Concur

Marinas

Two active marinas charted within the limits of this survey were confirmed.

On DN 309 docks for the Ida Island Marina were verified as per TP-01055 (Pos. Nos. 6087-6090). These docks are correctly depicted on the chart. The hydrographer recommends that a controlling depth of 1.4 meters at MLLW in position 38°10'17.316"N, 121°38'15.275"W, (Pos. No. 6091+2, DN 309, VN 0651) be charted in this marina. Concur

On DN 321 docks for the Hidden Harbor Marina as depicted on TP-01055 were verified (Pos. Nos. 334 to 341 and 862, DN 338). An addition to the marina, not shown on the chart or TP-01055, has been constructed with a separate entrance as discussed in Section J. A photocopy of the blueprint of the marina was obtained and annotated with position numbers in red ink. This photocopy is submitted with the field records. The hydrographer recommends that a controlling depth* of 1.4 meters at MLLW in position 38°11'09.819"N, 121°39'29.109"W, (Pos. No. 342+3, DN 321, VN 0652) be charted in Hidden Harbor West, and that a controlling* depth of 1.1 meters at MLLW in position 38°11'01.434"N, 121°39'15.550"W (Pos. No. 6949, Dn 321, VN 0651) be charted in Hidden Harbor East.* The controlling depths for Hidden Harbor likely vary overtime due to silting and harbor maintenance. The depths found by this survey may or may not represent the current situation. Do not recommend these controlling depths be used.

O. ADEQUACY OF SURVEY

This survey is a complete basic hydrographic survey and is adequate to supersede all prior surveys within their common areas. Concur

P. AIDS TO NAVIGATION

USCG Correspondence

The adjusted positions for aids to navigation provided by N/CG2333 (Pacific Photogrammetry Party) for aids positioned by GPS in January, 1992, were forwarded to the Eleventh Coast Guard District, Long Beach, CA in correspondence date July 31 and August 4, 1992. Copies of this correspondence were provided in Appendix VI (Supplemental Correspondence) of the Descriptive Report for H-10435 (October 1992). The NGS final adjusted positions for aids positioned by GPS in January, 1992, are provided in Appendix II*(Non-Floating Aids and Landmarks for Charts). * Attached to this report.

Position Comparisons

Table P-1 lists all aids to navigation and landmarks which fall within the H-10447 survey limits. This table was used to compare the charted positions, aerotriangulated positions, GPS (NGS final adjusted) positions, and hydrographic (DGPS control) positions of all aids to navigation. An inverse distance and bearing was computed using the HDAPS Geodetic Utility Program between the charted positions and the hydrographic positions. Where available, the GPS position, vice the field position, was used for comparison with the chart. Printouts from coastal mapping projects CM-8304 and CM-8400, which list the aerotriangulated positions (in NAD 27) for several of the navigational aids and landmarks, were provided for this project (copies in Appendix II)*. * Filed with the survey records

TABLE P-1

Floating/Non-Floating Aids and Landmarks ✓
Comparison of Charted Positions to Field Positions for H-10447

DESCRIPTION	LL POS.	CHARTED POS.	AERO POS.	GPS POS.	HYDRO. POS.	DP	DN	DIST.	∢
Chart 18661 **Sacramento River (SR)**									
1. SR BUOY 2 LLN 7620	38°10.6'N 121°39.9'W	38°10'35.0"N 121°39'53.5"W			38°10'39.0[illegible]"N 121°39'52.[illegible]"W	7203	323	129m	011°
2. SR LT 1 LLN 7625		38°10'40.5"N 121°39'50.0"W	38°10'40.734"N 121°39'49.070"W		38°10'40.62[illegible]"N 121°39'49.1[illegible]"W	7202	323	20.8m	080°
3. SR LT 4 LLN 7630		38°10'22.0"N 121°39'09.0"W	38°10'21.852"N 121°39'08.557"W	38°10'21.86905"N* 121°39'08.54914"W	38°10'21.9[illegible]"N 121°39'08.4[illegible]"W	6019	308	11.7m	110°
4. SR LT 5 LLN 7635		38°10'15.5"N 121°37'56.0"W	38°10'15.647"N 121°37'55.487"W		38°10'15.5[illegible]"N 121°37'55.4[illegible]"W	6034	308	14.5m	081°
5. SR LT 6 LLN 7640		38°09'58.5"N 121°37'42.0"W	38°09'58.248"N 121°37'41.005"W		38°09'58.3[illegible]"N 121°37'40.7[illegible]"W	6025	308	30.0m	101°
Chart 18661 **Sacramento River Deep Water Ship Channel (SRDWSC)**									
6. SRDWSC LT 37 LLN 7350		38°10'41.5"N 121°40'10.0"W	38°10'41.628"N 121°40'09.286"W		38°10'41.5[illegible]"N 121°40'09.3[illegible]"W	7205	323	15.3m	089°
7. SRDWSC LT 39 LLN 7355		38°11'10.0"N 121°39'45.0"W	38°11'09.795"N 121°39'44.644"W		38°11'09.5[illegible]"N 121°39'44.6[illegible]"W	7215	323	15.8m	149°
8. SRDWSC LT 40 LLN 7360		38°11'19.0"N 121°39'31.0"W	38°11'18.590"N 121°39'30.795"W		38°11'18.5[illegible]"N 121°39'30.7[illegible]"W	7216	323	15.7m	160°

TABLE P-1

Floating/Non-Floating Aids and Landmarks ✓
Comparison of Charted Positions to Field Positions for H-10447

DESCRIPTION	LL POS.	CHARTED POS.	AERO POS.	GPS POS.	HYDRO. POS.	DP	DN	DIST.	∢
9. SRDWSC LT 41 LLN 7365		38°11'39.0"N 121°39'29.0"W	38°11'38.472"N 121°39'28.745"W		38°11'38.47[illegible]"N 121°39'28.8[illegible]"W	7218	323	17.3m	168°
10. SRDWSC LT 42 LLN 7370		38°11'53.5"N 121°39'21.5"W	38°11'52.900"N 121°39'20.517"W	38°11'52.90753"N* 121°39'20.53206"W	38°11'52.8[illegible]"N 121°39'20.9[illegible]"W	7219	323	29.8m	128°
11. SRDWSC LT 43 LLN 7375		38°12'18.0"N 121°39'35.5"W	38°12'17.573"N 121°39'35.583"W		38°12'17.4[illegible]"N 121°39'35.5[illegible]"W	7222	323	17.4m	187°
12. SRDWSC LT 44 LLN 7380		38°12'43.5"N 121°39'50.0"W	38°12'43.551"N 121°39'49.405"W		38°12'43.2[illegible]"N 121°39'49.7[illegible]"W	7225	323	10.3m	139°
13. SRDWSC LT 45 LLN 7385		38°12'59.0"N 121°40'17.0"W	38°12'58.591"N 121°40'16.156"W		38°12'58.4[illegible]"N 121°40'15.8[illegible]"W	7228	323	32.5m	121°
14. SRDWSC LT 46 LLN 7390		38°13'02.0"N 121°40'08.0"W	38°13'02.344"N 121°40'07.912"W		38°13'01.9[illegible]"N 121°40'08.3[illegible]"W	7227	323	9.4m	261°
15. SRDWSC LT 47 LLN 7395		38°13'23.5"N 121°40'29.5"W			38°13'23.4[illegible]"N 121°40'28.5[illegible]"W	7231	323	24.4m	096°
16. SRDWSC LT 48 LLN 7400		38°13'24.5"'N 121°40'21.5"W	38°13'24.180"N 121°40'20.595"W	38°13'24.17600"N* 121°40'20.59857"W	38°13'23.9[illegible]"N 121°40'21.0[illegible]"W	7232	323	24.1m	115°
17. SRDWSC LT 49 LLN 7405		38°13'42.0"N 121°40'31.0"W			38°13'42.0[illegible]"N 121°40'32.4[illegible]"W	7235	323	34.4m	274°

TABLE P-1

Floating/Non-Floating Aids and Landmarks
Comparison of Charted Positions to Field Positions for H-10447

DESCRIPTION	LL POS.	CHARTED POS.	AERO POS.	GPS POS.	HYDRO. POS.	DP	DN	DIST.	ϕ
18. SRDWSC DBN 49A LLN 7410		38°14′01.0"N 121°40′30.0"W	38°13′59.910"N 121°40′29.960"W		38°14′00.079"N 121°40′29.824"W	7238	323	28.5m	174°
19. SRDWSC LT 50 LLN 7415		38°13′43.5"N 121°40′25.0"W	38°13′42.753"N 121°40′25.104"W		38°13′42.520"N 121°40′25.154"W	7234	323	30.4m	187°
20. SRDWSC LT 51 LLN 7420		38°14′15.5"N 121°40′26.0"W	38°13′42.753"N 121°40′25.104"W		38°14′14.521"N 121°40′26.178"W	7239	323	30.5m	188°
21. SRDWSC LT 52 LLN 7425		38°14′14.0"N 121°40′20.0"W	38°14′13.486"N 121°40′19.745"W		38°14′13.307"N 121°40′19.818"W	7240	323	22.0m	169°
22. TOWER (SW Trans at Isleton)			38°09′58.230"N 121°37′45.086"W		Remarks: Good Landmark. Visually Located & Verified. DN 308, VN 0651.				
23. TOWER (NE Trans at Isleton)			38°10′09.800"N 121°37′39.953"W		Remarks: Good Landmark. Visually Located & Verified. DN 308, VN 0651.				

* Position provided via N/CG2333 from NGS Project GPS-445. GPS positions are the final adjusted data.

The hydrographer found all fixed aids to navigation, when compared to their charted position shown on the 21st edition of Chart 18661, differed by less than 35 meters. Because the 34.4 meter maximum difference is less than one millimeter at the scale of the chart, the hydrographer believes no revisions to the location of these aids on Chart 18661 are required. All fixed aids to navigation within the limits of H-10442 adequately serve their established purpose. Concur

All floating aids to navigation within the limits of H-10442 were positioned by hydrographic methods. Descriptions and characteristics of these aids are provided in the field records.

The hydrographer notes that aids to navigation, particularly the fixed aids, are frequently damaged or destroyed by passing vessels, and are not always replaced in their exact charted location.

The NADCON computations which convert NAD 27 positions to NAD 83, and the inverse computations discussed above, are included in the data files.

The Ryer Island ferry charted near the confluence of Steamboat and Cache Sloughs is being renovated.

Pipeline and Cable Crossings

Overhead cable crossings were verified visually as shown on TP-01055. No cable clearance heights above Mean High Water were determined.

The cable ferry crossing to Hastings Tract shown on the chart in Lindsey Slough has been abandoned. On DN 310 (VN 0652) the abandoned ferry ramp on the southwest shore was located at 38°14'19.893"N, 121°41'06.832"W (Pos. No. 3). On DN 315 (VN 0652) the remains of the ramp on the northeast shore were located at 38°14'48.335"N, 121°41'47.091"W (Pos. No. 270). The hydrographer recommends removing the charted cable ferry crossing. Concur

The Liberty Island cable ferry shown on the chart in Cache Slough has been abandoned. On DN 310 (VN 0652) the abandoned ramp on the west shore was located at position 38°14'18.893"N, 121°41'06.832"W (Pos. No. 33). On DN 311 (VN 0652) the east shore ramp at Liberty Island was located at 38°14'20.937"N, 121°41'02.197'W (Pos. No. 136) on the east shore. The hydrographer recommends removing the cable ferry crossing from the chart. Concur

A charted submerged cable area between Lights 48 and 50 in Cache Slough/SRDWSC was not confirmed. During shoreline verification and hydrography in this area, no sign or other evidence of a submerged or overhead cable crossing could be located in the charted cable area between 38°13'38.879"N, 121°40'24.319"W, (Pos. No. 6236, VN 0651, DN 311) and 38°13'29.308"N, 121°40'23.103"W,

(Pos. No. 6237). The hydrographer recommends retaining this cable crossing as charted, lacking information to the contrary. Concur

A submerged cable crossing sign was located on the north shore of Brannan Island on the Sacramento River directly across from Long Island at position 38°09'51.622"N, 121°37'22.582"W (Pos. No. 6037, DN 308, VN 0651). This cable crossing is not shown on the chart or TP-01055. The hydrographer recommends charting a submerged cable crossing at the surveyed position and extending due north across to the south shore of Long Island. Concur

Q. STATISTICS

Description	Quantities
Total Positions:	2734
VN 0651	1838
VN 0652	896
Total Detached Positions:	345
VN 0651	179
VN 0652	166
Total Nautical Miles of Hydrography	131.3
Sq. Nautical Miles of Hydrography	2.7
Bottom Samples	45
Velocity Casts	5
Days of Production	19

R. MISCELLANEOUS ✓

Bottom samples were taken in accordance with Hydrographic Manual Section 1.6.3. Samples were not submitted to the Smithsonian Institution. Bottom sample positions are plotted on the overlays for FFS 22. Bottom sample descriptions are noted on FFS 22.

No further anomalous tidal conditions were observed.

Per Project Instructions, no current observations were conducted in the survey area.

No magnetic anomalies were observed.

S. RECOMMENDATIONS ✓

None.

T. REFERRAL TO REPORTS

TITLE	DATE	TO
1992 Horizontal Control Report, OPR-L208-PHP (by N/CG2333)	July, 1992	N/CG245

No separate Electronic Control Report or Corrections to Echo Soundings Report is scheduled for submittal.

Approved and Forwarded,

Gerd F. Glang
Lieutenant, NOAA
Chief of Party

CONTROL STATIONS as of 6 Jan 1993

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
713	F	038•07•07.203	121•42•30.435	38	139	0.0	0.0		09/23/92	NO. 8 USE 1931
755	F	038•09•31.464	121•41•00.942	64	139	0.0	0.0		09/23/92	RIOS 1992
763	F	038•10•07.984	121•35•41.342	36	139	0.0	0.0		09/23/92	GRAN 1992
765	F	038•06•22.733	121•42•02.399	46	243	0.0	0.0		09/23/92	MILL 1992
771	F	038•06•14.619	121•41•46.100	4	139	0.0	0.0		09/23/92	TRES 1992
772	F	038•06•55.977	121•40•55.574	3	139	0.0	0.0		09/23/92	MACK 1992
800	F	038:08:53.124	121:41:38.827	14	254	0.0	0.0		09/23/92	PHP1 1992 (DIFF. GPS REF.STA.)
801	F	038•10•42.619	121•40•11.592	3	139	0.0	0.0		09/23/92	SUBM 1992
802	F	038•10•21.524	121•38•07.535	7	139	0.0	0.0		09/23/92	SLUG 1992
803	F	038•09•52.752	121•37•20.114	6	139	0.0	0.0		09/23/92	BRAN 1992
804	F	038•10•21.868	121•39•08.551	8	139	0.0	0.0		09/23/92	LT04 1992
805	F	038•11•52.907	121•39•20.535	10	139	0.0	0.0		09/23/92	LT42 1992
806	F	038•11•09.601	121•38•52.796	7	139	0.0	0.0		09/23/92	STEM 1992
807	F	038:08:56.697	121:41:20.268	7	243	0.0	0.0		09/23/92	SR28 1992 (DIFF. GPS CHK.STA.)
808	F	038•14•42.746	121•41•54.274	13	139	0.0	0.0		09/23/92	LIN2 1992
809	F	038•14•10.596	121•41•04.162	4	139	0.0	0.0		09/23/92	FURY 1992
810	F	038•14•05.992	121•39•55.393	7	139	0.0	0.0		09/23/92	MINT 1992
811	F	038•13•24.176	121•40•20.602	10	139	0.0	0.0		09/23/92	CS40 1992
812	F	038•06•13.903	121•42•36.692	11	139	0.0	0.0		09/23/92	DECKER IS. N. END LT 1991
813	F	038•11•34.638	121•37•42.661	9	139	0.0	0.0		09/23/92	STEAMBOAT 1931
814	F	038•15•06.362	121•40•22.874	2	243	0.0	0.0		09/23/92	PROS 1992
815	F	038•14•37.242	121•40•43.374	4	243	0.0	0.0		09/23/92	ISLE 1992

1-6-93
GFG

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Seattle, Washington 98115-0070
Pacific Hydrographic Party
801 Beach Drive
Rio Vista, CA 94571-2003
(707) 374-5642

October 30, 1992

Commander
Eleventh Coast Guard District (oan)
Federal Building
501 W. Ocean Blvd.
Long Beach, CA 90822-5399

Dear Sir:

Please include the following notice in the next Local Notice to Mariners (LNM):

NORTHERN CALIFORNIA - SACRAMENTO RIVER - SACRAMENTO RIVER TO CACHE SLOUGH - SURVEY OPERATIONS - The NOAA Pacific Hydrographic Party will be conducting hydrographic survey operations on the Sacramento River, from approximately 1 NM north of the Rio Vista Bridge to latitude 38°15'N, **through December 15, 1992.** This survey includes portions of Cache Slough, Lindsey Slough, Prospect Slough, Steamboat Slough, and Miner Slough. Mariners can contact the survey vessels on VHF Channel 16 and are asked to keep well clear during survey operations. Any person with information on chart deficiencies which should be investigated during this survey can contact the Pacific Hydrographic Party at (707) 374-5642 or write to:

NOAA, Coast & Geodetic Survey
Chief, Pacific Hydrographic Party
USATF 801 Beach Drive
Rio Vista, CA 94571-2003

Charts: 18661, 18662

Please edit the text as required and/or publish this notice in the LNM until the survey completion date. This survey completes our project to update existing nautical charts for the Sacramento and San Joaquin Rivers. We are happy to address any charting deficiencies which the Coast Guard may be concerned with as well.

Sincerely,

Gerd F. Glang

Gerd F. Glang
Lieutenant, NOAA
Chief, Pacific Hydrographic Party

APPROVAL SHEET

for

SURVEY H-10447

I have reviewed the Descriptive Report, Final Field Sheets, and accompanying records for accuracy, completeness, compliance with project instructions, and adherence to required standards and procedures. Lieutenant David Neander (N/CG245) supervised all field work between November 01 and November 21, 1992, while acting as Chief, PHP; I supervised all remaining field work thereafter. LT Neander and I reviewed on a daily basis all field work to ensure a quality survey is forwarded for verification. I have personally examined the Final Field Sheets and all records of this survey during field processing. The data are forwarded for final review and processing to N/CG245, Pacific Hydrographic Section.

Approved and Forwarded,

Gerd F. Glang

2/13/93

Gerd F. Glang
Lieutenant, NOAA
Chief, Pacific Hydrographic Party

DATE

ORIGINAL

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 18, 1993

MARINE CENTER: Pacific

OPR: L-208

HYDROGRAPHIC SHEET: H-10447

LOCALITY: California, Sacramento River, Sacramento River to Cache Slough

TIME PERIOD: November 3 - December 3, 1992

TIDE STATION USED: 941-5316 Rio Vista, Sacramento R., Ca.
Lat. 38° 8.9'N Lon. 121° 41.5'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 941-5316 = 13.88 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 941-5316 = 4.0 ft.

TIDE STATION USED: 941-5414 Steamboat Slough, Ca.
Lat. 38° 12.0'N Lon. 121° 36.8'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 941-5414 = 13.62 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 941-5414 = 3.7 ft.

TIDE STATION USED: 941-5479 Ryer Island, Cache Slough, Ca.
Lat. 38° 13.7'N Lon. 121° 40.4'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 941-5479 = 7.84 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 941-5479 = 4.3 ft.

H-10447 continued

REMARKS: RECOMMENDED ZONING

1. South of 38° 11.0'N, and west of the confluence of the Sacramento River, Steamboat Slough, and Cache Slough, times and heights are direct on 941-5316.

2. In the Sacramento River, east of the confluence of the Sacramento River, Steamboat Slough and Cache Slough, apply a +30 minute time correction and a x0.97 range ratio to 941-5316.

3. In Steamboat Slough, times and heights are direct on 941-5414.

4. In Cache Slough, north of 38° 11.0'N, times and heights are direct on 941-5479.

NOTE: Hourly heights are tabulated on Pacific Standard Time.

CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

SURVEY NUMBER

H-10447

GEOGRAPHIC NAMES

Name on Survey	NOS Chart 18661 22nd Ed/Jan 9, 1993	NOS Chart 18662 18th Ed/May 23, 1992	TP-01055 1:20,000 March 1988	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H	U.S. LIGHT LIST K		
BRANNAN ISLAND	X		X						1
CACHE SLOUGH	X	X	X						2
CALIFORNIA (TITLE)									3
ELKHORN SLOUGH			X						4
GRAND ISLAND	X		X						5
HASTINGS TRACT			X						6
IDA ISLAND	X		X						7
LIBERTY ISLAND			X						8
LINDSEY SLOUGH		X	X						9
LONG ISLAND			X						10
MINER SLOUGH	X	X	X						11
PROSPECT ISLAND	X	X	X						12
PROSPECT SLOUGH	X	X							13
RYER ISLAND	X	X	X						14
SACRAMENTO RIVER	X		X						15
STEAMBOAT SLOUGH	X	X	X						16
WRIGHT CUT		X	X						17
									18
			Approved:						19
									20
			Charles L. Harrington						21
			Chief Geographer - N/CG2x5						22
			MAY 14 1993						23
									24
									25

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 77-27(H) (9-83)

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: H-10447

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	1
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	2					
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	*EVALUATION*	*TOTALS*
POSITIONS ON SHEET			2535
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	82		82
VERIFICATION OF SOUNDINGS	123		123
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	103		103
COMPARISON WITH PRIOR SURVEYS AND CHARTS		14	14
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		24	24
GEOGRAPHIC NAMES			
OTHER*		23	23
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	308	61	369

Pre-processing Examination by LT J. Griffin	*Beginning Date* 2/18/93	*Ending Date* 3/8/93
Verification of Field Data by E. Domingo, L. Deodato	*Time (Hours)* 308	*Ending Date* 5/5/94
Verification Check by J. Stringham, B. Olmstead	*Time (Hours)* 54	*Ending Date* 11/18/94
Evaluation and Analysis by B. Olmstead	*Time (Hours)* 61	*Ending Date* 12/5/94
Inspection by R. DAVIES	*Time (Hours)* 10	*Ending Date* 1/18/95

EVALUATION REPORT

H-10447

1. INTRODUCTION

Survey H-10447 is a basic hydrographic survey accomplished by the Pacific Hydrographic Party under the following Project Instructions.

OPR-L208-PHP, dated June 17, 1991

The purpose of this survey was to provide contemporary hydrographic data in the Sacramento River and surrounding tributaries and to aid in the updating of the bay model. This survey was conducted in California and covers an area centered four nautical miles north of Rio Vista. Specifically, this survey begins at the confluence of Cache Slough, Steamboat Slough, and the Sacramento River and extends north to include portions of Lindsey Slough, Prospect Slouth and Miner Slough. The surveyed limits extend from latitude 38/09/17N to latitude 38/15/27N and from longitude 121/37/07W to longitude 121/42/05W. The survey area is characterized by several sloughs that empty into the Sacramento River and which support both commercial shipping and recreational boating. The Sacramento River Deep Water Ship Channel (federally maintained channel), is the primary navigable waterway. The shoreline in the area consists of levees, low lying marsh islands and a number of private piers and marinas. The bottom consists primarily of mud and sand. Depths range from 0.0 to 30.7 meters.

Predicted tides for San Francisco, California were used for the reduction of soundings during field processing. Approved hourly heights zoned from Rio Vista, Steamboat Slough, and Ryer Island, were used during office processing. Gages listed in respective order are 941-5316, 941-5414 and 941-5479.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. NAD 83 is used as the horizontal datum for plotting and position computation. The offset values and sound velocity correctors are adequate. An accompanying computer printout contains the parameters and the correctors.

A digital file has been generated for this survey as required by Hydrographic Survey Guideline No. 52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report and the 1992 Horizontal Control Report for OPR-L208-PHP, contain adequate discussions of horizontal control and hydrographic positioning.

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The

quality of 4 positions exceeded the limit in terms of HDOP. These positions are isolated and occur randomly throughout the survey area. A review of the data indicates that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

The positions of the horizontal control stations used during hydrography are 1992 field values based on NAD 83.

The smooth sheet and accompanying overlays are annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: 0.305 seconds (9.398 meters)
Longitude: -3.838 seconds (-93.381 meters)

The year of establishment of control stations shown on the smooth sheet originates with the horizontal control records for this survey.

The following shoreline map was compiled on NAD 27 and applies to this survey.

	Photo Date	Scale
TP-01055	April 1983	1:20,000

The following shoreline changes are depicted on the smooth sheet in dashed red and were transferred from the final field sheet without supporting positional information. This list also includes several additional areas that were noted during office processing to contain discrepancies between the shoreline and the hydrography. Shoreline in these areas has been adjusted to best fit the depth information.

	Latitude(N)	Longitude(W)
MHWL	38/10/03	121/37/48
MHWL	38/10/19	121/38/01 to 38/10/31 121/39/12
MHWL	38/10/18	121/38/35
MHWL	38/10/29	121/39/13
MHWL	38/10/33	121/39/24
MHWL	38/10/27	121/40/24
MHWL	38/10/39	121/40/14 to 38/10/54 121/40/03
MHWL	38/11/09	121/38/52 to 38/11/00 121/39/21
MHWL	38/11/33	121/37/33
MHWL	38/11/40	121/37/20 to 38/11/40 121/37/57
MHWL	38/11/39	121/38/06
MHWL	38/11/37	121/39/20 to 38/11/52 121/39/21
MHWL	38/13/12	121/40/16 to 38/13/39 121/40/24

There are numerous shoreline revisions above latitude 38/14/00N where Minor Slough, Prospect Slough, and Lindsey Slough empty into Cache Slough and the Sacramento River Deep Water Channel. These revisions have not been listed due to such extensive change with the 1983 photography.

Shoreline revisions as discussed above are approximate but are adequate to supersede the common photogrammetrically delineated shoreline. Refer to the smooth sheet for an accurate depiction.

The following shoreline changes are depicted on the smooth sheet with a red line, and were transferred from the final field sheet with supporting position information. These revisions are adequate to supersede the common photogrammetrically delineated shoreline.

	Latitude(N)	Longitude(W)
Floating piers	38/10/07	121/37/42
Floating pier	38/10/03	121/37/52
Pier	38/10/19	121/38/16
Piers	38/10/20	121/38/32
Pier	38/10/20	121/38/50
Floating pier	38/14/43	121/39/44
Piers	38/14/19	121/41/07
Piers	38/14/45	121/41/49
Pier	38/14/40	121/41/48
Pier	38/14/49	121/41/48

3. HYDROGRAPHY

With the exceptions noted in this report, hydrography is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the standard depth curves;

b. reveal there are no significant discrepancies or anomalies requiring further investigation; and

c. show the survey was properly controlled and soundings are correctly plotted.

The hydrographer was apparently unable to define the zero curve throughout much of the survey area due to a combination of either significant cultural development, numerous foul areas, and or steeply sloping bottom just offshore of the mean high water line.

4. CONDITION OF SURVEY

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, March 1992 Edition, except as follows.

The final field sheet contained several shoreline changes which were portrayed in solid red and not supported by positional information. Changes to the photogrammetrically determined high water line delineation revealed by the hydrographic survey are shown using a dashed red line where not supported by positional information. Reference Hydrographic Survey Guideline No. 57, section 1.6.2.

AWOIS item 51647, a row of dolphins PA, charted at latitude 38/10/49.690N, longitude 121/39/48.830W, was investigated using a visual search and twenty five meter echo ensonification. This investigation did not meet the AWOIS specifications requiring that either a bottom drag or dive investigation be conducted to resolve the existence of these features.

5. JUNCTIONS

Survey H-10447 junctions with the following survey.

Survey	Year	Scale	Area
H-10442	1992	10,000	South

The junction with survey H-10442 is complete. A few soundings have been transferred to the present survey to better portray the bottom within the common area. A comparison with the chart on the northern limits of the present survey reveal adequate agreement.

6. COMPARISON WITH PRIOR SURVEYS

There are no prior hydrographic surveys common to the present survey.

7. COMPARISON WITH CHART

Chart 18661, 22nd Edition, dated January 9, 1993; scale 1:40,000
Chart 18662, 18th Edition, dated May 23, 1992; scale 1:40,000

a. Hydrography

Charted hydrography originates with miscellaneous sources. A comparison with the charted depths generally reveal good agreement. Present survey soundings are generally deeper from 0.5 to 1.5 meters primarily due to contemporary dredging activities and spoil dumping creating constant changes of depth.

Survey H-10447 is adequate to supersede charted hydrography within the common area with the following exception.

	Latitude	Longitude	AWOIS
Row of Dols(PA)	38/10/49.690N	121/39/48.830W	51647

Except for those features previously listed, survey H-10447 is adequate to supersede charted hydrography within the common area.

b. AWOIS

The disposition of all AWOIS items originating from miscellaneous sources is adequately discussed by the hydrographer in section N. Specific AWOIS item investigation forms have been filed with the hydrographic data. AWOIS item 51647, a row of dolphins, PA, charted at latitude 38/10/49.690N, longitude 121/39/48.830W, was not investigated according to the stated specifications and should be retained as submerged.

c. Controlling Depths

The Sacramento River Deep Water Channel is a federally maintained channel that resides within the area of this survey. The depths found during this survey are consistent with or deeper than the charted controlling depths and or reported channel depths. However, there appears to be some indication of shoaling along the eastern portions of the Sacramento River Deep Water Ship Channel between Lights "50" and" 52". This is in an area where Miner Slough empties into Cache Slough and should be carefully monitored due to silting. Another area of apparent shoaling is along the western portion of the Sacramento River Deep Water Ship Channel between Daybeacon "49A" and vicinity Light" 51".

d. Aids to Navigation

There are twenty fixed and one floating aid within the area of this survey. These aids were located by hydrographic methods using DGPS and serve their intended purpose. Refer to the hydrographer's report, section P, for specific information. Four special purpose buoys mark the east and west entrances to Hidden Harbor. In addition, three special purpose buoys are located in a small tributary that flows into Minor Slough. These buoys are used to control speed limits and reduce wakes within the waterway.

All charted landmarks should remain as charted.

e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation

There were no dangers to navigation reported by the hydrographer. No dangers to navigation were reported during office processing.

8. COMPLIANCE WITH INSTRUCTIONS

Survey H-10447 adequately complies with the Project Instructions except as noted in secton 4 of this report.

9. ADDITIONAL FIELD WORK

This is an adequate hydrographic survey. Additional field work is recommended on a low priority basis to locate the features not found or disproven during this survey, as noted in section 7 of this report.

Bruce A Olmstead

Bruce A. Olmstead
Senior Cartographer

APPROVAL SHEET
H-10447

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Russ Davies for
Dennis J. Hill
Chief, Hydrographic Processing Unit
Pacific Hydrographic Section

Date: 1/18/95

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy Timmons
Commander Kathy Timmons, NOAA
Chief, Pacific Hydrographic Section

Date: 1/30/95

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Final Approval

Approved:

Thomas W. Richards
Captain, NOAA
Chief, Nautical Charting Division

Date: 2/8/95

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10447

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
18661			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
18020	1/30/95	Bruce A. Olmstead	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
18010	1/30/95	Bruce A. Olmstead	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
501	1/30/95	Bruce A. Olmstead	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
530	1/30/95	Bruce A. Olmstead	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
50	1/30/95	Bruce A. Olmstead	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.